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Abstract Title: Effects of Test Temperature on Flow of Metallic Glasses

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Abstract:

Micro-hardness experiments were conducted over a range of temperatures using a Nikon QM micro-hardness machine on a number of metallic glass (e.g. Zr-, Fe-, Al-) systems. Although high micro-hardness was exhibited at room temperature, significant hardness reductions were exhibited near the glass transition temperature, T_g. The effects of changes in test temperature on the micro-hardness will be reported. The effects of exposure time on the hardness evolution at a given temperature will also be summarized to illustrate some of the differences in behavior of the systems shown. The extreme softening near T_g, characteristic of bulk metallic glass systems, enables the exploration of novel deformation processing. In order to develop deformation processing windows, the evaluation of bulk metallic glass mechanical properties under quasi-static conditions and the determination of flow properties at different temperatures and strain rates are reported. The use of such information to create layered/composite bulk metallic glasses will be summarized.